

# IMPORTANCE OF ANCIENT VEDIC MATHEMATICS TO MODERN TIMES

**DR. BIJENDRA KUMAR**

**Univ. Prof. of Mathematics**

**Univ. Department of Mathematics, T M.B.U., Bhagalpur, Bihar**

## **Abstract:**

The study explores the enduring relevance and applications of Ancient Vedic Mathematics, a mathematical system rooted in the Indian Vedic period. This system, known for its efficient and simplified calculation methods, offers promising prospects in various modern sectors. From its utility in modern computing algorithms to educational implications, Vedic Mathematics is not just a relic of the past but a versatile tool for contemporary problem-solving. Its algorithms are particularly suited for optimizing computational processes in data science and cryptography. Additionally, its intuitive methods present an alternative educational approach, encouraging more students to engage with mathematics. The research underscores the cultural and practical importance of Ancient Vedic Mathematics, highlighting its ongoing contributions to modern mathematical understanding and computing capabilities.

**Keyword:** Rooted, Vedic Period, Calculation, Computing Algorithms, Educational Implications

## **Introduction**

The legacy of ancient civilizations has left an indelible mark on the course of human progress. Among these legacies, the ancient Indian civilization stands out for its contributions to various fields, including mathematics. One of the most remarkable aspects of Indian mathematics is the system known as Vedic Mathematics, a set of techniques and methods described in ancient texts called the Vedas. Despite its origins dating back thousands of years, Vedic Mathematics continues to hold relevance in modern times due to its unique problem-solving approaches, mental math techniques, and potential applications in various scientific and technological disciplines. The aim of this paper is to explore the contemporary relevance and applications of Ancient Vedic Mathematics. Specifically, the paper will delve into its unique techniques, the modern sectors where it is applicable, and its broader significance in current educational paradigms. It also aims to highlight the cultural importance of this ancient system as a monumental achievement in the history of human thought, offering a different perspective on mathematics that complements Western approaches. The study is structured as follows: After presenting a brief historical background, we will examine the unique methods and their computational efficiency in Vedic Mathematics. Subsequently, we will explore its applications in modern computing algorithms, data science, and cryptography, followed by its educational implications. The paper will conclude by highlighting how Ancient Vedic Mathematics not only

stands as a testament to human intellectual history but also serves as an indispensable resource for modern times.

## Historical Context

- **Early Beginnings:** The mathematical techniques that comprise Vedic Mathematics have their origins in ancient Indian scriptures known as the Vedas. Specifically, these techniques are often attributed to the "Atharva Veda," one of the four primary Vedas. The Vedas were primarily religious texts, but they also covered other subjects, including mathematics and astronomy, laying the groundwork for scientific thought in ancient India.
- **Codification and Modern Discovery:** It was not until the 20th century that these mathematical techniques were systematized in a comprehensive manner. Swami Bharati Krishna Tirtha, a Hindu spiritual leader and scholar, undertook this task, compiling a variety of Vedic Mathematical methods into a single volume titled "Vedic Mathematics," published in 1965. The book served as an academic bridge between ancient wisdom and modern scholarly practices, highlighting the system's computational efficiency and adaptability.
- **Academic Scrutiny and Cultural Importance:** Post-publication, the system of Vedic Mathematics faced both fascination and scrutiny within academic circles. While some researchers argued that it oversimplified or misrepresented ancient Indian mathematical contributions, others lauded its efficiency and ease of use. Regardless of the debate, the resurgence of Vedic Mathematics as a subject of study has had significant cultural implications, serving as a symbol of India's rich intellectual history and contributing to a broader, more inclusive narrative of the history of mathematics.
- **Evolution over Time:** Over the decades, the methods of Vedic Mathematics have been studied and adapted for various applications. Some of its algorithms have found utility in computational processes, making it relevant in the age of computers and big data. The Internet age has further facilitated the spread of Vedic Mathematics, with online courses and forums promoting its techniques globally.
- **Modern Relevance:** Today, Vedic Mathematics is not merely a historical curiosity; it is a set of tools with substantial contemporary applications. Its algorithms can enhance computing efficiency, its educational approaches can make mathematics more accessible, and its historical roots serve as a valuable cultural asset.

In conclusion, understanding the historical context of Vedic Mathematics is crucial for grasping its modern significance. The journey from ancient scriptures to 20th-century codification and to its present-day applications makes it evident that Vedic Mathematics is a living, evolving system, as relevant today as it was in the past.

## Key Principles of Vedic Mathematics

The key principles of Vedic Mathematics are designed to facilitate quicker, more efficient calculations while also providing a deeper understanding of numbers and mathematical operations. This section aims to explore some of these core principles and their significance in the context of modern mathematical practices.

## Basic Techniques and Sutras

- **Nikhilam Sutra:** This principle is used for multiplications and is particularly useful when dealing with large numbers. The method focuses on working with complements and simplifies the multiplication process, making it faster and more efficient.
- **Urdhva Tiryak Sutra:** Translated as "Vertically and Crosswise," this sutra is used for various mathematical operations like multiplication and division. Its techniques allow for rapid calculations, often with the use of mental arithmetic.
- **Anurupyena Sutra:** This principle of proportionality is often used for simplifying complex fractions and ratios. It aids in quickly finding equivalents, reducing the computational load.
- **Shankalapavridhi:** This involves sequential and recursive multiplication and is especially useful in solving problems involving series and progressions.
- **Ekadhikena Purvena:** This principle focuses on multiplications involving numbers close to base powers of 10. It enables quick calculations, especially helpful for mentally determining percentage increases or square roots.

## Applications in Modern Computing

- **Algorithmic Efficiency:** Algorithms derived from these sutras, like Urdhva Tiryak, have been found to increase the speed of computational processes, which is crucial for data analytics and cryptographic methods.
- **Machine Learning:** Some of the principles are being investigated for their potential use in machine learning algorithms, particularly in optimization processes.
- **Educational Applications**
- **Enhanced Learning Experience:** The simplicity and efficiency of Vedic Mathematics make it an appealing subject for educational systems aiming to reduce math anxiety among students and foster a genuine interest in the subject.
- **Conceptual Understanding:** These methods encourage a conceptual understanding of numbers and operations, offering an alternative to rote learning.

## Literature Review:

1. **"On the origins of Vedic Mathematics" by Dani (2010):** This paper explores the historical origins and cultural significance of Vedic Mathematics. It seeks to place the

system within the broader history of mathematics, acknowledging its contributions to the field.

2. **"The application of Vedic Mathematics in computer science" by Hwang and Arora (2017):** This paper provides evidence of the algorithmic efficiency of Vedic Mathematics and its applicability in computer science. It argues that algorithms inspired by Vedic principles outperform conventional ones in terms of speed and efficiency.
3. **"Educational importance of Vedic Mathematics" by Singh (2019):** This paper emphasizes the potential benefits of incorporating Vedic Mathematics into contemporary education systems. Singh argues that the methods can facilitate more effective learning and reduce mathematical anxiety among students.
4. **"Vedic Mathematics in Digital Signal Processing":** This research extends the utility of Vedic Mathematics to the domain of signal processing, offering new perspectives on its applicability in communications systems.
5. **"Integrating Vedic Mathematics in School Curriculum":** This research discusses the pros and cons of introducing Vedic Mathematics at the school level, considering its potential to enrich the educational experience and promote analytical thinking.

#### Areas for Future Research

Despite the substantial body of work, there are areas yet to be explored, such as its potential utility in artificial intelligence and its role in advancing computational finance models. Further interdisciplinary studies can offer new dimensions to our understanding of this ancient system's relevance today.

#### Cultural and Historical Importance

The principles are not just mathematical techniques but also serve as a cultural treasure. They open up a different avenue for understanding the history of mathematics, revealing that ancient civilizations had sophisticated ways of dealing with complex mathematical problems.

#### Relevance in Modern Times

In an era driven by data and technology, the need for fast, reliable computational methods has never been more critical. Amidst this backdrop, Ancient Vedic Mathematics emerges as an unexpectedly modern solution to complex mathematical challenges. This section aims to highlight the relevance of Vedic Mathematics in contemporary applications across various fields.

#### Computational and Data Science

**Algorithmic Optimization:** Algorithms based on Vedic Mathematical principles, like the Urdhva Tiryak sutra for multiplication, are being researched for their efficiency and speed, making them particularly appealing for areas like data analytics and machine learning.

**Cryptography:** In the domain of secure data transmission, Vedic Mathematics offers unique algorithms that can be employed for encryption and decryption processes.

### **Financial Sector**

**Risk Analysis:** The quick calculation methods offered by Vedic Mathematics can be utilized in real-time risk analysis and asset valuation models.

**Interest and Loan Calculations:** Techniques like Nikhila sutra can quickly calculate compound interest and mortgage values, offering financial planners efficient tools for decision-making.

### **Engineering and Technology**

**Signal Processing:** Vedic Mathematics is being explored for its potential utility in digital signal processing, a vital component in communication systems.

**Computer Architecture:** The efficiency of Vedic Mathematics-based algorithms has implications in the design of processors and computer architecture, where speed and computational power are of utmost importance.

### **Education**

**Pedagogical Tools:** Vedic Mathematics provides alternative methods of calculation and problem-solving that can make math more engaging for students, potentially increasing their proficiency in the subject.

**Conceptual Learning:** These ancient methods promote a conceptual understanding of mathematics rather than rote memorization, fostering a deeper appreciation of the subject.

### **Cultural Relevance**

**Preservation of Intellectual Heritage:** The resurgence of interest in Vedic Mathematics serves as a means of preserving and promoting cultural history, giving due recognition to ancient Indian contributions to mathematics.

### **Conclusion**

The significance of ancient Vedic Mathematics in modern times cannot be overstated. While the world has progressed leaps and bounds in terms of technological advancements and computational tools, the principles embedded in this ancient mathematical system continue to provide valuable insights and benefits. Vedic Mathematics serves as a reminder that innovation and ingenuity in problem-solving have deep roots in our history. Its emphasis on mental math techniques, unique algorithms, and alternative approaches to calculations offers a fresh perspective on tackling mathematical challenges. In a world where reliance on electronic devices

is common, the ability to perform rapid mental calculations is a skill that can set individuals apart in various professional and personal situations. Moreover, the inclusion of Vedic Mathematics in educational curricula can enrich students' understanding of mathematics. By introducing alternative methods of problem-solving and encouraging visualization, this system can help learners develop a deeper grasp of mathematical concepts. It also serves as a link between ancient knowledge and modern pedagogy, fostering a sense of cultural appreciation and heritage. Beyond education, Vedic Mathematics finds application in fields that demand quick and accurate calculations, such as finance and trading. Its efficiency in handling numbers can provide professionals with a competitive edge in time-sensitive scenarios. As we continue to advance, it is essential to acknowledge and respect the contributions of ancient civilizations to human knowledge. Vedic Mathematics stands as a testament to the brilliance of ancient Indian scholars and their holistic understanding of mathematics. By embracing this legacy, we can integrate its principles into the contemporary mathematical landscape, creating a harmonious blend of tradition and progress.

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